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Second Five-Year Review Report

for the

Jennison-Wright Corporation Superfund Site
Granite City, Madison County
Illinois



PREPARED BY:

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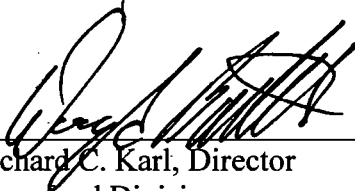
for the

U.S. Environmental Protection Agency
Region 5, Chicago, Illinois

June 2014

Approved by:

Date:

for 
Richard C. Karl, Director
Superfund Division
U.S. EPA Region 5

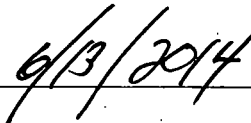

6/13/2014

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List of Acronyms

AST	Aboveground Storage Tank
ACM	Asbestos-Containing Material
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below Ground Surface
CFR	Code of Federal Regulation
COPC	Contaminant of Potential Concern
CUO	Cleanup Objective
CY	Cubic Yards
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EE/CA	Engineering Evaluation and Cost Analysis
EPA	United States Environmental Protection Agency
ERA	Ecological Risk Assessment
ESD	Explanation of Significant Difference
FYR	Five-Year Review
HRC®	Hydrogen Release Compound
IC	Institutional Control
IDNR	Illinois Department of Natural Resources
Illinois EPA	Illinois Environmental Protection Agency
JW	Jennison-Wright
LTRA	Long term remedial action
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
NCP	National Contingency Plan
NAPL	Non-Aqueous Phase Liquid
NPL	National Priorities List
O&M	Operation and Maintenance
ORC	Oxygen Release Compound
PAH	Polynuclear Aromatic Hydrocarbon
PCP	Pentachlorophenol
PFR/RAU	Potential for Reuse/Ready for Anticipated Use
PRP	Potentially Responsible Party
RACM	Regulated Asbestos-Containing Material
RAO	Remedial Action Objective
ROD	Record of Decision
RPM	Remedial Project Manager
SVOC	Semi-Volatile Organic Compound
TBC	To Be Considered
TEF	Toxicity Equivalent Factor
UST	Underground Storage Tank
UU/UE	Unlimited Use/Unrestricted Exposure
VOC	Volatile Organic Compound

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Executive Summary

The Illinois Environmental Protection Agency (Illinois EPA), in consultation with the U.S. Environmental Protection Agency (EPA), has completed the second Five-Year Review (FYR) at the Jennison-Wright Corporation (JW) Superfund site located in Granite City, Madison County, Illinois. The purpose of this FYR is to review site information to determine if the remedy is and will continue to be protective of human health and the environment. Completion of the second FYR at the JW site was triggered by the completion of the first FYR report on June 15, 2009.

The 20-acre, triangular-shaped JW site contains an abandoned wood-treating facility and is located on 22nd Street in Granite City, Illinois, about six miles northeast of St. Louis, Missouri, and about two miles east of the Mississippi River. A mixed residential-industrial neighborhood surrounds the site.

Site operations began prior to 1921 and continued until 1989. Over time, the wood-treating facility used creosote, pentachlorophenol (PCP), and zinc naphthanate to process railroad ties and other products. Dioxin is associated with waste PCP material at the site. The Jennison-Wright Corporation also manufactured "Jennite," an asphalt sealant, at the site.

The JW site is bisected by 22nd Street and the former storage areas for untreated and treated wood products were located north of 22nd Street with the former facility process areas located south of the street. The southern portion contains a lagoon area, an asphalt waste (Jennite) pit, and an area with buried PCP and dioxin waste. The southern area also had several stockpiles of contaminated soil plus a buried railcar that had been used to contain waste creosote and PCP.

Illinois EPA began investigating the JW site in 1988 and conducted three removal actions at the site over the next 15 years. EPA placed the site on the National Priorities List on June 17, 1996. Illinois EPA, in consultation with EPA, issued a Record of Decision (ROD) in September 1999 and an Explanation of Significant Differences (ESD) in October 2005 to clean up the site by excavating contaminated soil; removing listed hazardous wastes, debris, and miscellaneous items; removing and treating non-aqueous phase liquid (NAPL) waste; treating contaminated groundwater; and implementing monitored natural attenuation (MNA) of groundwater.

Illinois EPA issued a second ESD in June 2009 to further modify the site remedy to place institutional controls (ICs) on the site; excavate contaminated soil from under 22nd Street; change from aerobic biodegradation to anaerobic biodegradation as a method to treat groundwater; and excavate NAPL from beneath the Jennite Pit. Illinois EPA completed construction of the remedy in September 2009 and the project is now in long-term remedial action (LTRA) status.

Upon review, EPA, in consultation with Illinois EPA, finds that the JW site remedy is protective of human health and the environment in the short term because there are no complete exposure pathways at the site and all remedial components are in place and operating. However, in order for the remedy to be protective of human health and the environment over the long term, an undersized NAPL treatment component must be replaced; the storm water retention area should be reggraded to make the side slopes less steep; ICs must be fully implemented to prevent the use of groundwater until the groundwater cleanup levels are met, prevent the disturbance of soil contaminants contained in place, maintain the integrity of the remedial and monitoring systems,

and prohibit the future residential use of the property; and a risk analysis should be conducted to determine the impact of EPA's 2012 change in the non-cancer toxicity factor for dioxin.

Because hazardous substances, pollutants, or contaminants remain in place at the JW site above levels that allow for unlimited use and unrestricted exposure (UU/UE), EPA plans to conduct the third FYR at the site within five years of the completion of this FYR report.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Jennison-Wright Corporation		
EPA ID: ILD006282479		
Region: 5	State: IL	City/County: Granite City/Madison
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	Has the site achieved construction completion? Yes	
REVIEW STATUS		
Lead agency: Illinois EPA		
Author name (Federal or State Project Manager): Erin Rednour		
Author affiliation: Illinois EPA		
Review period: 8/1/2013 – 6/13/2014		
Date of site inspection: 11/15/2013		
Type of review: Statutory		
Review number: 2		
Triggering action date: 6/15/2009		
Due date: 6/13/2014		

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
None
Issues and Recommendations Identified in the Five-Year Review:

OU(s): OU1 and Site wide	Issue Category: Institutional Controls			
	Issue: ICs need to be placed on the site to prevent the use of groundwater until the groundwater cleanup levels are met, prevent the disturbance of soil contaminants contained in place, maintain the integrity of the remedial and monitoring systems, and prohibit the future residential use of the property.			
	Recommendation: Develop an environmental covenant under UECA.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	Illinois EPA	EPA	6/15/2015

OU(s): OU1 and Site wide	Issue Category: Remedy Performance			
	Issue: The oil-water separator (OWS) for the NAPL/water treatment system is undersized.			
	Recommendation: Illinois EPA should replace the OWS with a properly-sized unit.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	Illinois EPA	EPA	6/15/2015

OU(s): OU1 and Site wide	Issue Category: Site Safety			
	Issue: The storm water retention area may be a safety hazard because the side slopes are too steep.			
	Recommendation: Illinois EPA should regrade the storm water retention area to decrease the steepness of the side slopes.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	Illinois EPA	EPA	6/15/2015

OU(s): OU1 and Site wide	Issue Category: Remedy Performance			
	Issue: EPA changed the non-cancer toxicity factor for dioxin in 2012.			
	Recommendation: Illinois EPA should conduct a risk analysis to determine the impact of EPA's 2012 change in the non-cancer toxicity factor for dioxin.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	Illinois EPA	EPA	6/15/2015

OU 1 and Site-wide Protectiveness Statement(s)

Short-term Protective

Protectiveness Statement:

The JW site remedy is protective of human health and the environment in the short term because there are no complete exposure pathways at the site and all remedial components are in place and operating. However, in order for the remedy to be protective of human health and the environment over the long term, an undersized NAPL treatment component must be replaced; the storm water retention area should be regraded to make the side slopes less steep; ICs must be fully implemented to prevent the use of groundwater until the groundwater cleanup levels are met, prevent the disturbance of soil contaminants contained in place, maintain the integrity of the remedial and monitoring systems, and prohibit the future residential use of the property; and a risk analysis should be conducted to determine the impact of EPA's 2012 change in the non-cancer toxicity factor for dioxin.

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I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is or will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports. In addition, FYR reports identify protectiveness issues found during the review, if any, and document recommendations for actions to be taken to address them.

The U.S. Environmental Protection Agency (EPA) conducts FYRs pursuant to Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP). CERCLA 121 states:

“If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.”

EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which states:

“If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action.”

The Illinois Environmental Protection Agency (Illinois EPA) as lead agency, in consultation with support agency (U.S.) EPA Region 5, has conducted the second FYR of the remedial actions at the Jennison-Wright Corporation (JW) Superfund site in Granite City, Madison County, Illinois. Illinois EPA and EPA reviewed operating data from the site and conducted this statutory FYR from August 2013 through June 2014. This FYR report documents the results of the review.

The triggering action for this review is the completion date of the previous FYR report, June 15, 2009. The FYR is required because hazardous substances, pollutants, or contaminants remain at the site above levels that allow for UU/UE. The site consists of one operable unit (OU), which is addressed in this FYR.¹

Illinois EPA and EPA will place the completed FYR report in the JW site files and at the local site information repository at the Granite City Public Library, 2001 Delmar Avenue, Granite City, Illinois 62040.

¹ Illinois EPA initially defined the JW site as having five OUs in the 1999 ROD. EPA redefined the site in the first FYR report as having all remedial actions taking place under just one OU.

II. PROGRESS SINCE THE LAST REVIEW

Protectiveness Determination and Status of Recommendations from the 2009 FYR

EPA signed the first FYR report for the JW site in June 2009 and determined that the remedy was expected to be protective of human health and the environment upon completion of remedy construction, the attainment of groundwater cleanup objectives, and the implementation of institutional controls (ICs). In the interim, EPA noted that there were no complete exposure pathways present and therefore no unacceptable risks at the site.

EPA recommended in the 2009 FYR report that ICs be implemented, monitored, and enforced. In addition, EPA recommended that the groundwater cleanup objective for arsenic be revised to reflect the recent change in the maximum contaminant level (MCL) for arsenic under the Safe Drinking Water Act.

Table 1, below, presents a summary of issues and the actions taken to address them since the June 2009 FYR.

Table 1: Status of Recommendations from the 2009 FYR

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Party	Original Milestone Date	Current Status	Completion Date (if applicable)
Arsenic MCL was changed (lowered).	Evaluate whether the groundwater cleanup objective for arsenic should be revised.	Illinois EPA	EPA	6/1/2010	Complete: no longer an issue at the site.	Illinois EPA reported issue resolution on 5/23/2014
ICs must be implemented, monitored, maintained, and enforced.	Implement an environmental covenant under the UECA*	Illinois EPA	EPA	6 months after construction completion 3/30/2010	Pending	Planned for 6/15/2015
	Pass a city drinking water ordinance.	Illinois EPA/Granite City, Illinois	EPA	1 year after construction completion 9/30/2010	Complete	4/30/2010

*Illinois Uniform Environmental Covenants Act, 765 ILCS Ch. 122 (UECA), effective January 1, 2009.

Recommendation 1

Arsenic was identified as a chemical of concern (COC) in groundwater when the 1999 ROD was signed. The groundwater cleanup objective for arsenic was set at its MCL at that time, which was 50 micrograms per liter ($\mu\text{g/L}$) ("parts per billion"). In January 2006, EPA lowered the arsenic

MCL to 10 µg/L, which then prompted Illinois EPA to plan to evaluate whether the 50 µg/L groundwater cleanup objective for arsenic should be lowered to 10 µg/L as well.

From 2013-2014, Illinois EPA reviewed the Engineering Evaluation and Cost Analysis (EE/CA) report it had completed for the JW site and in May 2014 it determined that the arsenic MCL issue was no longer relevant. Illinois EPA found that only one soil sample in the EE/CA slightly exceeded the calculated background level of 11.57 milligrams per kilogram (mg/kg) ("parts per million"). However, the arsenic concentration in that soil sample was still within the range of naturally-occurring or "background" arsenic concentrations for soil in the area; also, the calculated upper confidence level of all the samples collected at the JW site, 7.7 mg/kg, was below the calculated background concentration. Illinois EPA also reviewed the JW site-use history and determined that arsenic was not used in any of the manufacturing or wood treatment operations at the site. Therefore, soil arsenic levels detected at the site are believed to represent background levels and not site-related contamination.

Although arsenic was listed on the potential COC list for groundwater in the EE/CA report, it was never a COC in the soil. Since arsenic was not used at the site and it is not present above soil background levels, Illinois EPA concluded that arsenic would not impact groundwater at the site. Thus, arsenic is no longer a COC in groundwater and the change in arsenic MCL is not relevant to the site cleanup effort.

Recommendations 2 and 3

The 2009 FYR identified specific areas on the JW site that do not allow for UU/UE and thus require land- and groundwater-use limitations be placed in order to be protective of human health and the environment. Although the ICs are not yet fully in place, the site is currently fenced and the site security personnel assure that site access is restricted.

Illinois EPA issued a second ESD in June 2009 and identified desired land- and groundwater-use limitations to implement at the site. The ESD called for an IC Plan be implemented once the construction of the remedial action was completed (in September 2009). Earlier, the Illinois legislature had passed the Illinois Uniform Environmental Covenants Act, 765 ILCS Ch. 122 (UECA), which became effective on January 1, 2009. The IC Plan requires implementation of ICs including UECA environmental covenants over non-UU/UE site areas.

In February 2010, Illinois EPA submitted an IC Implementation Plan (ICIP) to EPA for review and concurrence. In order to protect public health and maintain site quality, the following objectives were considered during the selection of ICs for the site and development of the ICIP:

- Prevent use of groundwater until groundwater cleanup levels are met,
- Prevent disturbance of residual subsurface soil contaminants,
- Maintain the integrity of the current or future remedial and monitoring systems, and
- Prohibit the development and use of the property for residential purposes.

Illinois EPA considered four categories of IC mechanisms - governmental controls, proprietary controls, enforcement and permitting controls, and informational controls - for the site. After a

thorough screening of IC types and combinations, Illinois EPA proposed the following ICs for the JW site:

- Establish groundwater management zones (GMZs) to prohibit groundwater use unless treatment is performed rendering it safe for its intended use;
- Implement Environmental Land Use Controls (ELUCs) to limit activity in areas of high residual soil contaminant levels. These ICs would be instituted through the use of a proprietary environmental covenant under the UECA, which will control site activities and future uses of the property;
- Continue to restrict future residential use or development of the site in accordance with Granite City's zoning ordinance;
- Continue to operate and maintain all engineering controls implemented at the site; and
- Continue to monitor groundwater quality at the site.

Illinois EPA approved a Granite City Ordinance #7529 for use as an IC in April 2010 and plans to complete the environmental covenant under the UECA by June 2015 (also see ICs section, below).

Operation and Maintenance (O&M)

Illinois EPA began implementing the remedial actions at the JW site in September 2004 and achieved construction completion in September 2009. The site is now in LTRA status. Groundwater remediation is currently underway and Illinois EPA is using various remedial approaches that include the operation of a hot water injection system to recover NAPL and the injection of Hydrogen Releasing Compound (HRC®) into site groundwater to treat a pentachlorophenol (PCP) contaminant plume.

In 2009, Illinois EPA prepared an O&M Plan and an O&M Manual for the JW site. The O&M Plan details the administrative requirements for inspecting, operating, and maintaining the LTRA, including ICs. The O&M Manual covers operational requirements for the NAPL recovery and groundwater treatment systems plus requirements for long-term groundwater monitoring, influent and effluent sampling, and systems performance tracking. Sampling is conducted at the site under an EPA-approved Quality Assurance Project Plan (2010).

Operation and maintenance costs on a per month basis are variable, but typically run approximately \$50,000/month. The site is currently being operated and maintained by REACT Environmental, an Illinois EPA contractor who was awarded the bid for O&M through the State of Illinois procurement process.

REACT Environmental is conducting tasks that include O&M of the groundwater treatment system such as periodic removal of Organoclay and change-out of granular activated carbon (GAC) tanks, quarterly sampling of groundwater monitoring wells, preparation of quarterly reports, and submission of O&M and groundwater monitoring data to Illinois EPA.

Institutional Controls

ICs are required at the JW site to ensure the long-term protectiveness of the remedy. ICs are non-engineered instruments, such as administrative and/or legal controls, that help minimize the potential for human exposure to contamination and protect the integrity of the remedy. Compliance with ICs is required to assure protectiveness for any areas which do not allow for UU/UE. Compliance with effective ICs will be ensured by implementing, maintaining, monitoring and enforcing effective ICs as well as maintaining the site remedy components. Table 2 identifies site areas that do not support UU/UE and require land- and groundwater-use limitations in order to be protective of human health and the environment.

Table 2: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Entire Jennison-Wright site	Yes	Yes	North and south parcels	Limit future site use to commercial/industrial.	Environmental Covenant under UECA (Planned)
Area to the east of the eastern border of the JW property extending from 22 nd Street to the southern boundary.	Yes	Yes	South parcel	Prohibit excavation of soil and prohibit groundwater use.	Environmental Covenant under UECA (Planned) Granite City Drinking Water Ordinance #7529
The former drip track area in the vicinity of 22 nd Street along the eastern boundary of the JW property.	Yes	Yes	North parcel	Prohibit excavation of soil in the area.	Environmental Covenant under UECA (Planned)
Area H (the northeast corner of the site).	Yes	Yes	North parcel	Prohibit excavation of soil in Area H.	Environmental Covenant under UECA (Planned)
Groundwater: On-site and off property (the	Yes	Yes	North and south parcels	Prohibit well drilling, use of groundwater as drinking	Granite City Drinking Water Ordinance

alley on the western border and the area east of the eastern border).				water, and exposure to groundwater with contaminant levels above clean-up objectives.	#7529
Alley adjacent to the western boundary of southern portion.	Yes	Yes	South parcel	Prohibit groundwater use and land use (prohibit excavation and disturbance of cover).	Environmental Covenant under UECA (Planned) Granite City Drinking Water Ordinance #7529

Status of ICs and Follow-up Actions Required

Granite City passed Ordinance #7529, signed July 18, 2001, that prohibits the use of groundwater as a potable water supply by the installation or use of potable water supply wells or by any other method within the corporate city limits. Illinois EPA completed a review of the ordinance and approved of its use as an IC as of April 2010. As noted on the Illinois EPA website:

“Ordinance approved. No MOU required. The Agency's survey of approved groundwater ordinances confirms that this ordinance remains valid for use as an environmental institutional control pursuant to 35 Ill. Adm. Code 742 as of April 2010.”
(See: <http://epadata.epa.state.il.us/land/gwordinance/municipality.asp>)

Therefore, an IC to prevent the ingestion of groundwater has been instituted at the local level.

However, the remainder of the ICs need to be codified within an environmental covenant under the UECA.

Illinois EPA, in consultation with EPA, developed an IC Plan that includes preventing the use of groundwater until the groundwater cleanup levels are met, preventing disturbance of soil contaminants remaining in place, maintaining the integrity of the remedial and monitoring systems, and prohibiting the future residential use of the property.

A map depicting the areas that required institutional controls is in Attachment 1 (Figure 3).

Current Compliance

Even though the ICs have not been fully implemented, there are currently no known uses of the JW site which would be considered inconsistent with the goals to be achieved by the ICs. Access to the site is restricted by a fence. Based on inspections and interviews, Illinois EPA is not aware

of uses of the site or media uses that are inconsistent with the stated objectives that will be required in ICs.

Long Term Stewardships of ICs

The IC Plan includes provisions to ensure maintenance and compliance with land- and groundwater-use restrictions and limitations at the site. Long-term protectiveness requires compliance with effective ICs. Long-term stewardship procedures will be developed to ensure that the remedy continues to function as intended with regard to ICs. The plan includes regular evaluation of ICs at the site and annual certification to EPA that ICs are in place and effective.

III. FIVE-YEAR REVIEW PROCESS

Administrative Components

Illinois EPA conducted the second FYR at the JW site with assistance from EPA. The review, which began on November 15, 2013, consisted of the following components:

- Community involvement;
- Document review;
- Data review;
- Site inspection; and
- FYR report development and review.

Community Notification and Involvement

Illinois EPA published a notice announcing the start of the second FYR in the *Granite City Journal* on Wednesday, May 7, 2014. The public was invited to submit any comments or concerns to either Illinois EPA or EPA. The notice also informed the citizens that the results of the review and the report will be made available at the site information repository located at the Granite City Public Library, 2001 Delmar Avenue, Granite City, Illinois 62040.

No requests for information were received.

At the same time the public notice was issued, Illinois EPA called the City to ask if there were any known issues with the site. The Director of Economic Development stated he knew of no particular issues with the site.

Document Review

The following documents were reviewed during this FYR:

- September 1999 EE/CA
- September 1999 ROD
- July 2003 Remedial Design
- October 2005 ESD

- June 2009 ESD
- Quarterly Groundwater Monitoring and NAPL Separation/Hot Water Injection System Status Reports
- July 2013 Interim Remedial Action (RA) Completion Report

Data Review

Illinois EPA reviewed the quarterly Groundwater Monitoring and NAPL Separation/Hot Water Injection Treatment System Status Reports submitted by its contractors for the period of October 1, 2010 through March 30, 2012. Data covering the period of September 2009 until September 2010 was also reviewed (July 2013 Interim RA Completion Report).

NAPL removal

NAPL is removed from the site through a system of six hot-water injection wells placed along the NAPL plume boundary and two groundwater/NAPL extraction wells centered within the injection well network. The extraction wells pump contaminated groundwater and recovered NAPL to the treatment system that consists of a phase separation step (an oil-water separator (OWS)) where the NAPL is separated from the water by specific gravity. Recovered NAPL is stored in a tank for off-site disposal. Separated groundwater is then treated by clay adsorption and GAC to remove dissolved metals and organic compounds. Most of the treated water is then sent to the hot-water generation system to be injected into the NAPL plume and the remainder is discharged to the Granite City waste water treatment plant under a permit.

Table 3, below, provides information on the mass of contaminants removed by the NAPL treatment system.

Table 3: Mass of contaminants removed by the NAPL system

Date	Total SVOC Mass Removed	Estimated Effectiveness of NAPL Separator*
October-December 2010	363 pounds	Not efficient
January-March 2011	360 pounds	Not efficient
April-June 2011	252 pounds	Not efficient
July-September 2011	(Not available)	(Not efficient)
October-December 2011	307 pounds	Not efficient
January-March 2012	181 pounds	Not efficient

*The oil-water separator is undersized, therefore, some NAPL is breaking through and being treated by the groundwater treatment system.

Illinois EPA reports that system performance is very good in terms of the hot water injection being able to mobilize a fair amount of NAPL for recovery. However, the OWS has been found to be undersized because it can't fully separate the NAPL from the contaminated groundwater. Residual NAPL is in the separated groundwater being sent to the water treatment system and is being absorbed onto padding and caught in bag filters attached to the system to temporarily address this issue. Illinois EPA is currently designing a larger OWS to replace the undersized unit.

HRC® injection

Two rounds of HRC® injections were completed in the PCP process area prior to completion of the June 2009 FYR report. Illinois EPA conducted a third round of HRC® injections in the PCP process area in late July 2009. The 2009 injection was designed to span the horizontal and vertical extent of the PCP groundwater contaminant plume to maximize the anaerobic treatment of PCP. To date, concentrations of PCP and other contaminants of concern still exceed their cleanup levels and ICs will be needed to minimize potential exposure until the cleanup levels are met.

Groundwater monitoring

There are four groundwater management zones designated at the site (see Figure 3 in Appendix B). Monitoring shows that contaminant concentrations remain above cleanup levels at the 22nd Street lagoon area (where NAPL is being removed), the PCP Process area, "Area H," and the Jennite Pit. Each area has NAPL present and, therefore, groundwater contaminant levels will remain high until the NAPL is addressed. Illinois EPA reports that contaminant concentrations are generally decreasing, but are still well above cleanup levels. Figure 4 (Appendix B) shows PCP concentrations at the site based on December 2009 sampling results. Table 4 shows PCP concentrations based on March 2012 sampling results. PCP concentrations are still above the cleanup level (1 µg/L) to date; however, the results are generally lower than those taken from November 2011.

Table 4. PCP levels in groundwater monitoring wells

Date	MW-5S	MW-8S	MW-8M	MW-17S	MW-18S	MW-20	MW-22	MW-23
Nov 2011	750	720,000	12	3,800	1.4	1.4	0.63	210
Mar 2012	800	75,000	1.1	1,700	0.22J	0.36J	0.97	270

All sample results are in µg/L. J – Result is less than Reporting Limit, but greater than or equal to the Method Detection Limit and the concentration is an approximate value.

ICs will be used to manage these areas until groundwater cleanup levels are met.

Soil cleanup

Soil excavation work was completed by September 2009 at several areas of the site. Over 83,000 tons of contaminated soil and debris was shipped offsite for disposal or thermal treatment

(dioxin). Based on post-excavation sampling results, there are three areas on site where the residual soil contaminants exceed the soil cleanup levels (PAHs). These are the railroad crossing at 22nd Street (active train line and subgrade utilities prevented complete removal), "Area H" (excavated to the water table, but sidewalls were visually contaminated near a railroad line and an off-site building), and along the eastern property boundary on railroad easements (access not granted to conduct cleanup). Illinois EPA plans to manage these areas using ICs.

Site Inspection

The FYR site inspection was conducted on November 15, 2013. In attendance were Erin Rednour, Illinois EPA, and Sheila Sullivan, EPA. Also present was Tony Warren of REACT Environmental (Illinois EPA's contractor). The purpose of the inspection was to assess the protectiveness of the remedy.

Mr. Warren conducted a review of the operation of the NAPL and groundwater systems and the parties discussed the status of the inefficient OWS unit. It was also discussed that when the undersized OWS is replaced by a larger unit, there will not be enough room for the larger unit where the undersized OWS is currently located. The new larger OWS will likely be located in the side extension located on the north side of the treatment system building.

The parties also noted that although the storm water retention area was properly sized, it may be unsafe because the side slopes are very steep. It was recommended that the area be regraded to decrease the steepness of the side slopes.

IV. TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

Yes. The remedy is currently in LTRA. Illinois EPA completed construction of the groundwater and NAPL treatment system in September 2009 and the system was declared operational and functional the next year. Data review shows that except for the inefficient separation of NAPL by the undersized OWS, the system is functioning as intended. NAPL is being recovered from the 22nd Street lagoon area and disposed of off site, although the undersized OWS is causing the groundwater treatment system to treat for residual NAPL in the water as well as for dissolved contaminants.

There is evidence that the HRC® injections were beneficial because the concentration of PCP in groundwater measured in MW-8S near the PCP Area on the west side of the site decreased from 720,000 µg/L to 75,000 µg/L. At MW-8M, the PCP concentration decreased from 12 µg/L to 1.1 µg/L. It is too soon to determine if natural attenuation of groundwater is occurring, as PCP levels are still very high and NAPL is present.

ICs are required at the site to limit future site use to commercial/industrial uses and prohibit excavation of soil and groundwater use in various areas of the site.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?

There were two changes to toxicity data, cleanup levels, or remedial action objectives at the JW site. The first was the reduction of the arsenic MCL from 50 µg/L to 10 µg/L (in 2006) and the second was the change in the dioxin noncarcinogenic toxicity level in 2012.

The June 2009 FYR report noted that arsenic was a chemical of concern (COC) in groundwater when the 1999 ROD was signed and that the groundwater cleanup objective for arsenic was set at its MCL of 50 µg/L. Because EPA lowered the arsenic MCL to 10 µg/L in 2006, the FYR report recommended that Illinois EPA evaluate whether the cleanup level should be reset to 10 µg/L to match the MCL. Illinois EPA reviewed the EE/CA during this FYR period and determined that although arsenic was listed on the potential COC list for groundwater, it was never a COC in the soil. Since arsenic was not used at the site and it is not present above soil background levels, Illinois EPA concluded that arsenic would not impact groundwater at the site. Thus, arsenic is no longer a COC in groundwater and the change in arsenic MCL is not relevant to the site cleanup effort.

On February 17, 2012, EPA issued a revised non-cancer toxicity value for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) (dioxin). The 1999 ROD has a soil cleanup level of 1 µg/kg (ppb or 1,000 ppt) toxicity equivalence (TEQ) for dioxin for on-site soil under a future commercial/industrial use scenario. The dioxin soil cleanup level was not changed in the ESDs. Because the dioxin non-cancer toxicity value has changed since the ROD and ESDs were issued, the 1000 ppt (TEQ) ROD cleanup level is now less stringent than EPA's current soil screening level (based on the reference dose) of 600 ppt for commercial/industrial site use. Illinois EPA, therefore, evaluated the impact of the change in dioxin non-cancer toxicity value with regard to the residual dioxin levels in on-site soil. Upon review of the on-site confirmation sampling data for dioxin, there are two sample locations that showed dioxin levels to exceed the 600 ppt screening level for commercial/industrial use at depths of 8 feet and 15 feet (just above the water table). Above each of these locations is clean fill. In addition, site access is restricted by fencing, thus, the soil cleanup remedy continues to be protective in the short term. Illinois EPA will conduct a risk analysis to determine whether if the change in the dioxin non-cancer toxicity value impacts long term protectiveness.

For residential soil, EPA's soil screening level for dioxin is 50 ppt (TEQ). Illinois EPA will also evaluate the impact of the change in dioxin non-cancer toxicity value with regard to the residual dioxin levels in soil in the residential areas.

The remainder of the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection are still valid.

Question C: has any other information come to light that could call into question the protectiveness of the remedy?

No. There has been no new information which would suggest the selected remedy is not protective.

Technical Assessment Summary

The remedy constructed at the JW site is functioning as intended. Construction was completed in September 2009. This review has revealed that the NAPL/water treatment system is not performing optimally due to an undersized OWS that does not fully separate recovered NAPL from pumped groundwater. Thus, the capacity of the OWS should be increased.

There is evidence that the HRC® injections were beneficial because the concentration of PCP in groundwater measured in MW-8S near the PCP Area on the west side of the site decreased from 720,000 µg/L to 75,000 µg/L. At MW-8M, the PCP concentration decreased from 12 µg/L to 1.1 µg/L. It is too soon to determine if natural attenuation of groundwater is occurring, as PCP levels are still very high and NAPL is present.

Granite City passed Ordinance #7529 on July 18, 2001 that prohibits the use of groundwater as a potable water supply by the installation or use of potable water supply wells or by any other method within the corporate city limits. Illinois EPA approved its use as an IC in April 2010. An environmental covenant under the UECA is planned to be completed.

Except as noted above regarding the revised non-cancer toxicity value for dioxin, exposure assumptions, toxicity data, cleanup levels, and Remedial Action Objectives (RAOs) used at the time of remedy selection are still valid.

During the FYR site inspection, Illinois EPA and EPA discovered that the on-site storm water retention area might be a safety hazard because the side slopes are very steep. The storm water retention area should be regraded to decrease the steepness of the side slope.

No other new information has been identified which would suggest the selected remedy will not be protective in the future.

V. ISSUES/RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 5, next page, presents issues and recommendations for follow-up actions for the JW site remedy.

VI. PROTECTIVENESS STATEMENT

The JW site remedy is protective of human health and the environment in the short term because there are no complete exposure pathways at the site and all remedial components are in place and operating. However, in order for the remedy to be protective of human health and the environment over the long term, an undersized NAPL treatment component must be replaced; the storm water retention area should be regraded to make the side slopes less steep; ICs must be fully implemented to prevent the use of groundwater until the groundwater cleanup levels are met, prevent the disturbance of soil contaminants contained in place, maintain the integrity of the remedial and monitoring systems, and prohibit the future residential use of the property; and a risk analysis should be conducted to determine the impact of EPA's 2012 change in the non-cancer toxicity factor for dioxin.

Table 5: Issues and Recommendations/Follow-up Actions

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
						Current	Future
OU1 and Sitewide	ICs need to be placed on the site to prevent the use of groundwater until the groundwater cleanup levels are met, prevent the disturbance of soil contaminants contained in place, maintain the integrity of the remedial and monitoring systems, and prohibit the future residential use of the property.	Develop an environmental covenant under UECA.	Illinois EPA	EPA	6/15/2015	No	Yes
OU1 and Sitewide	The OWS for the NAPL/water treatment system is undersized.	Illinois EPA should replace the OWS with a properly-sized unit.	Illinois EPA	EPA	6/15/2015	No	Yes
OU1 and Sitewide	The storm water retention area may be unsafe.	Illinois EPA should regrade the storm water retention area to decrease the steepness of the side slopes.	Illinois EPA	EPA	6/15/2015	No	Yes
OU1, and Sitewide	EPA changed the dioxin non-cancer toxicity factor.	Illinois EPA should conduct a risk analysis to determine if long term protectiveness is compromised due to the change the dioxin non-cancer toxicity factor.	Illinois EPA	EPA	6/15/2015	No	Yes

VII. NEXT REVIEW

The next FYR at the JW site will be completed no later than five years from the completion date of this report.

APPENDIX A – EXISTING SITE INFORMATION

A. SITE CHRONOLOGY

Table 6 presents a chronology of site events to date.

Table 6: Site Chronology

Event	Date
Facility operations	About 1921 to 1989
Judicial Consent Decree signed between Jennison-Wright Corporation and Illinois EPA	January 1986
Completed site assessment	1988
Jennison-Wright Corporation files for bankruptcy	November 1989
CERCLA Expanded Site Inspection report	July 1991
On-site stabilization work (first removal action)	May 1992
Engineering Evaluation/Cost Analysis (EE/CA) for removal action	January 1994
Second removal action	November 1994 to March 1995
Proposal to National Priorities List (NPL)	October 2, 1995
Final NPL listing	June 17, 1996
EE/CA for remedial action	February 1997 to September 1999
Record of Decision (ROD) signed	September 29, 1999
Remedial design start	September 30, 1999
Third removal action	2003
Remedial design complete	July 21, 2003
Remedial action start	September 24, 2004
First Explanation of Significant Differences	December 27, 2005

Second Explanation of Significant Differences	June 5, 2009
First FYR Report	June 15, 2009
Construction Completion	September 28, 2009
Draft Interim Remedial Action Completion Report	March 2011
Interim Remedial Action Completion Report	July 2013

B. BACKGROUND

Physical Characteristics

The Jennison-Wright Superfund site is a 20-acre abandoned railroad-tie treating facility located at 900 W. 22nd Street in Granite City, Madison County, Illinois, about six miles northeast of St. Louis, Missouri. The property is about two miles west of the Mississippi River. (See Attachment 1 for maps of the site.) The area surrounding the property is a mixed residential-industrial neighborhood. The property is bisected by 22nd Street, with former storage areas for untreated and treated wood located north of this street and the former facility process areas located south of the street. The Illinois-American Water Company waterworks facility is immediately north of the site. Railroad tracks border the site along the entire eastern boundary, and an alley and residences border the site along its entire western boundary. The site topography is relatively flat, with surface runoff toward the northeast from areas north of 22nd Street.

In the St. Louis metropolitan area, the Mississippi River occupies a deep bedrock valley that has been filled with both glacial outwash material and recent alluvium. The thickness of the valley fill is generally greater than 100 feet. In the Granite City area, the thickness is about 115 feet. The stratigraphy of the valley fill consists of silt, clay, sand, and gravel. The upper 15 to 30 feet is commonly silt and clay with fine sand. Below this depth, the deposits vary from poorly graded to well graded sands and gravels, grading to coarser sands and gravels that extend to bedrock. The bedrock in the area consists of Mississippian and Pennsylvanian limestone and dolomites with lesser amounts of shale and sandstone. Major supplies of groundwater have historically been withdrawn from the valley fill material.

Although some private and industrial wells are still located in the area, the majority of the domestic and industrial water for the Granite City area is obtained from the Mississippi River. Groundwater in the valley fill deposits occur under unconfined water table conditions. The water table is generally found at depths ranging from 15 to 20 feet below ground surface (bgs). Groundwater flow is primarily southwest towards the Mississippi River, except in areas of high pumpage, which form large depressions in the water table. The bedrock in the area is considered a poor source of water primarily due to its low permeability and poor water quality.

Land and Resource Use

Currently, there is no on-site use of the property. The facility is situated in a mixed

industrial/residential neighborhood and is bordered by the Norfolk-Southern Railroad lines to the east and south, residential areas to the west, and property occupied by the Illinois-American Water Company, a residential area, and 23rd Street to the north. The anticipated future use of the property is assumed to be commercial/industrial. Factors contributing to this assumption include:

- Records indicating the use of the property has been commercial/industrial for many years;
- Proximity of the adjacent railroad spur makes the property much more attractive to industrial use rather than residential; and
- Granite City has expressed an interest in redeveloping the site as an industrial complex once the remedial efforts have been completed.

Groundwater in the vicinity of the site is encountered at a depth of 17 feet bgs and flows southwesterly across the site. Although some private and industrial wells are still located in the area, the majority of the domestic and industrial water for the Granite City area is obtained from the Mississippi River.

At the time of this FYR the current and projected land use has not changed. Illinois EPA will implement ICs to prohibit residential use of the site and the installation of wells.

History of Contamination

Operations at the facility began prior to 1921 and continued until 1989 with three separate companies operating at the site: Midland Creosoting Company (prior to 1921-1940), the Jennison-Wright Corporation (1940-1981) and 2-B-J.W., Inc (1981-1989), authorized to do business as Jennison-Wright Corporation. Jennison-Wright Corporation filed for bankruptcy in November 1989, with an auction held in 1990 to sell the remaining equipment and materials. The site remained vacant from 1990 until the first removal cleanup action began in 1992.

The site is triangular-shaped and is bisected by 22nd Street, creating a north and south portion. The area south of 22nd Street was the former location of treatment processes for wood products (railroad ties and wood block flooring) using pentachlorophenol (PCP), creosote and zinc naphthenate. Creosote was used for treating wood products prior to 1921 to 1989, pentachlorophenol was used from 1974 to 1985, and zinc naphthenate was used from 1985 to 1989. The area north of 22nd Street was primarily used for drying the treated wood and for storage of supplies.

Jennite (an asphalt sealer product composed of coal tar pitch, clay, and water) was manufactured in the southeastern corner of the facility. The process began in the early 1960s and continued until summer 1986 when Jennison-Wright sold the Jennite process to Neyra Industries. Neyra Industries leased the portion of the facility used by Jennison-Wright for the manufacturing Jennite and continued manufacturing the asphalt sealer until the bankruptcy in 1989.

A site investigation performed by Illinois EPA in 1988 showed that subsurface contamination was found both in the soil and groundwater. The soil contamination was visible and was

confirmed analytically through the unsaturated zone to groundwater, near the 22nd Street lagoon, the Jennite Pit, and the PCP process area. Soil contamination in the remainder of the site was found at various depths ranging from 1 to 5 feet bgs.

Illinois EPA completed six soil borings in 1991, which showed discolored oily groundwater contamination. Illinois EPA then conducted an Engineering Evaluation and Cost Analysis (EE/CA) investigation in January 1994 and found:

- Significant sources of contamination in drums and tanks;
- Dioxins/furans and carcinogenic polynuclear aromatic hydrocarbons (PAHs) in surface soils;
- PCP in groundwater in the PCP process area; and carcinogenic PAHs, benzene, PCP, arsenic, 2,4-dimethylphenol, and naphthalene in groundwater under the 22nd Street lagoon;
- Benzene and naphthalene in subsurface soils;
- Structurally unsound on-site buildings and silos; and
- Four on-site buildings containing regulated asbestos containing material (ACM).

Initial Response

Manufacturing operations at the site ceased in 1989. Illinois EPA soon took several removal actions to stabilize the site and demolish on-site buildings.

Illinois EPA conducted the first removal action in May 1992 and, in summer 1992, Illinois EPA used trust fund monies from the bankruptcy sale to initiate a stabilization effort on the site to prevent the spread of contamination. The contents of the Jennite Pit located at the east boundary of the south portion of the site had become semi-liquid and begun to migrate off-site. To temporarily alleviate this problem, the overflowing material was removed and placed in three cutoff tanks. A temporary clay cap was constructed using materials on-site to shore up the sides of the Jennite Pit. Approximately 175 drums of various known and unknown materials were found on-site including 15 drums of creosote-contaminated asbestos insulation. These drums were stored on-site in an existing structure.

Other work accomplished during this removal:

- Removal of 22 cubic yards (cy) of ACM
- Pumping of 1,300 gallons of creosote-contaminated water to an above ground storage tank; and excavation and temporary on-site storage of creosote, tar, and contaminated soil that had migrated off-site from the Jennite Pit.

Illinois EPA initiated the second removal response on November 8, 1994 and completed it on March 6, 1995. This action implemented the recommendations in the 1994 EE/CA, which included:

- Installation of a six-foot chain link fence around the area of stockpiled soil and drainage area at the northeast corner of the site;

- Excavation and disposal of soils around the upright storage tanks and railroad cars;
- Removal of aqueous waste from the various storage vessels, treatment by oil/water separation, and off-site disposal at a water treatment plant;
- Removal and disposal of creosote waste material from the storage vessels;
- Decontamination/dismantling of the storage vessels;
- Characterization of the material within the drums inside the transite-sided building and proper disposal;
- Installation of a protective geomembrane and clay cap over the Jennite Pit;
- Removal of the contaminated soil in the three cutoff tanks in the south portion of the site and dismantling of the tanks.

EPA placed the JW site on the National Priorities List (NPL) on June 17, 1996.

As part of a third removal action, in 2003, Illinois EPA demolished on-site buildings, removed aboveground storage tanks (ASTs), underground storage tanks (USTs) and debris piles, and constructed a permanent decontamination pad on the southern portion of the site.

Basis for Taking Action

Past site practices have resulted in leakage/spillage of chemicals to surface soils, or, in the case of the Jennite Pit and the 22nd Street lagoon, direct deposition of wastes into the soil. Once released to the soil, contamination migrated to subsurface soils and groundwater. Table 7 (next page) shows the chemicals present in each media of concern. Contaminants of concern in site soil included phenols, dioxins, and a number of semivolatile organic compounds (SVOCs), most of which were PAHs. Benzo(a)pyrene, a PAH, was detected in site soil samples at a maximum concentration of 2,800,000 µg/kg and another PAH, naphthalene, was detected at concentrations up to 4,200,000 µg/kg. PCP was detected in site soils at concentrations up to 670,000 µg/kg. Dioxins were detected in site soils at a toxicity equivalency factor (TEF) of up to 66 µg/kg. Groundwater at the site contained phenols and PAHs, as well as volatile organic compounds (VOCs) such as benzene, xylenes, and toluene. The most significant areas of groundwater contamination identified were in the northeast corner of the south portion of the site near the 22nd Street lagoon and the former PCP treatment process area. Phenol was detected in groundwater at concentrations up to 9,800 µg/L, PCP at concentrations up to 88,000 µg/L, and naphthalene at concentrations up to 21,000 µg/L.

Sampling results indicate that in shallow groundwater, PCP contaminant levels are highest in the vicinity of the former PCP process area and the 22nd Street lagoon. PCP concentrations are significantly lower in the intermediate groundwater samples collected in these areas, suggesting that limited downward migration of PCP in groundwater occurred at the site.

Illinois EPA collected 81 gridded surface soil samples, 15 biased surface soil samples, 72 subsurface soil samples, 4 sediment samples, and a total of 58 groundwater samples in the shallow (20 feet bgs), intermediate (45 feet bgs), and deep (100 feet bgs) ranges. Contamination from site operations was found in both surface and subsurface samples with varying degrees of concentration. Contamination was also found in the groundwater in all three depth ranges with a significant NAPL source in the northeast corner of the south portion of the site.

Table 7: Chemicals of Concern in Soil and Groundwater

Chemical	Surface Soil	Subsurface Soil	Groundwater
Acenaphthene	X	X	X
Arsenic			X
Benzene		X	X
Benzo(a)anthracene	X		
Benzo(a)pyrene	X	X	
Benzo(b)fluoranthene	X	X	X
Benzo(k)fluoranthene	X	X	X
Beryllium	X		
Carbazole	X	X	
Chloroform			X
Chromium	X		
Chrysene	X	X	X
Di(2-ethylhexyl)phthalate			X
Dibenzo(a,h)anthracene	X	X	
1,2-Dichloroethane			X
2,4-Dimethylnhenol		X	X
Ethylbenzene			X
alpha-Hexachlorocyclohexane	X		X
Indeno(1,2,3-cd)pyrene	X	X	
Lead	X		X
Manganese	X		X
Methylene chloride			X
2-Methylphenol			X
Naphthalene	X	X	X
Pentachlorophenol	X	X	X
Phenol			X
2,3,7,8 TCDD Equivalents (dioxin)	X		
Thallium			X
Toluene			X
Trichloroethene (TCE)			X

During the EE/CA, a risk assessment was performed to estimate the health or environmental problems that could result if the proposed actions were not conducted to clean up the site. The general conclusion of the human health risk assessment conducted for the JW site was that the site posed unacceptable risks to human health in both current and future use scenarios. Remedial action was therefore warranted.

There are a number of major factors causing the unacceptable risks for humans including:

- The presence of dioxins/dibenzofurans and carcinogenic PAHs in site surface soils;
- The presence of several PAHs and PCP in the groundwater at several locations around the site; and;
- The presence of benzene and naphthalene in subsurface soils.

Exposure scenarios were evaluated for a number of possible exposures and reflect the excess lifetime cancer risks if no cleanup activities are conducted. An industrial/commercial use of the property was assumed for purposes of projecting future risk due to the history of the site as an industrial complex. Seven different exposure scenarios were considered: current site visitor (soil and air exposure); current nearby residents (air exposure); future permanent site worker (soil and air exposure); future permanent site worker (groundwater ingestion exposure); future construction worker (soil and air exposure); future nearby residents (chronic air exposure); and future nearby residents (during construction). Three exposure risks exceeded acceptable levels:

- Current site visitor (soil and air exposure)
- Future permanent site worker (groundwater ingestion exposure)
- Future construction worker (soil and air exposure)

The Ecological Risk Assessment (ERA) was prepared based on information collected by Illinois EPA during the site characterization investigation from July through September 1997. Federal and state agencies were consulted for information on sensitive habitats and protected species in the vicinity of the site, and relevant maps were reviewed to identify nearby sensitive habitats. In addition, information was obtained from a local Illinois Department of Natural Resources (IDNR) representative who visited the site. A quantitative ecological risk evaluation for the JW site was not performed because the findings of the ERA indicate that the site is not likely to impact wildlife. The conclusions of the ecological portion of the risk assessment are:

- Habitat at the JW site is of a very low quality to wildlife;
- The site is located in a mixed industrial/residential area. Only common wildlife accustomed to human activity and disturbance are likely to use the site; and
- The closest aquatic resource and ecologically sensitive areas to the JW site are located approximately one mile away and are not likely to be impacted by on-site contamination.

Based on the above, no adverse impacts to wildlife and/or sensitive habitats in the vicinity of the site were expected to result from contamination at the site.

Remedial Action Objectives

Based on the identified applicable or relevant and appropriate requirements (ARARs) and to-be-considered (TBC) requirements, and the need to reduce the potential threat to human health and the environment, the following general remedial action objectives (RAOs) were developed for the JW site:

- Prevent current nearby residents and potential future site workers from contacting, ingesting, or inhaling on-site soil and waste materials containing chemicals of potential concerns (COPCs) that exceed the calculated risk-based cleanup objectives (CUOs) (see Attachment 2);
- Prevent the continued release of contaminants to groundwater;
- Initiate long-term groundwater restoration to MCLs;
- Abate regulated ACM present in the on-site buildings;
- Remove listed hazardous waste from the site for treatment and disposal at an appropriately licensed facility;
- To the extent practical, pump NAPL from the subsurface in the vicinity of the 22nd Street lagoon; and
- Treat collected groundwater.

C. REMEDIAL ACTIONS

Remedy Selection

The 1999 ROD envisioned five operable units: soils and wastes, NAPL, groundwater, buildings, and miscellaneous items. These operable units reflect the principal purpose of the selected remedy, which was to control exposure to site contaminants by: treating on-site contaminated soils; removing listed hazardous wastes, debris and miscellaneous items; removal and treatment of NAPL; and treating groundwater. Also, while remedial action is on-going, the site has been fenced and periodic groundwater monitoring has been conducted. The cleanup goals are based on commercial/industrial use, consistent with the current and projected future land use. Specifically, the main components of remedy selected in the September 29, 1999 ROD were:

- For site wastes consisting of the drip track residue and the oils found on-site, remove the waste and dispose of it at a hazardous waste facility;
- For site soils, a landfarm could be constructed in the northeast portion of the site. This component of the remedy was changed to excavation and off-site disposal in the October 2005 ESD;
- For NAPL removal, hot water flushing;
- For the more highly contaminated groundwater plumes, enhanced in-situ biological treatment using oxygen release compounds (ORC®) and air sparging;
- Monitored natural attenuation was the selected alternative for the other areas of the site where groundwater contamination was at a much lower concentration;
- The buildings and other structures on the site would be razed and the ACM inside would be abated; and

- Miscellaneous items, such as debris piles, storage tanks, abandoned steel trams and several sumps; and pits were to be removed from the site.

An October 2005 ESD modified the soil remediation method from landfarming treatment in an on-site treatment unit to excavation and off-site disposal of contaminated soil. The excavated areas would then be backfilled with clean material and seeded. A second ESD, signed in June 2009, modified the remedy to include: ICs, the use of a different substrate to enhance *in situ* groundwater bioremediation, excavation of soils beneath 22nd Street, extraction and off-site disposal of NAPL from the Jennite Pit, and identification of a contingency remedy for potential additional NAPL and groundwater contamination in the Jennite Pit area.

Remedy Implementation

Illinois EPA began the remedial design on September 30, 1999 and completed it on July 2, 2003. The remedial action started a year later, on September 24, 2004 and it was completed in September 2009. The site is now in LTRA.

All buildings and on-site debris have been removed from the site. Trip track residues and oils have been removed from the site and disposed of appropriately. Site soils from both the north and south parcels have been excavated in accordance with the October 2005 ESD. Illinois EPA has completed the excavations of the 22nd Street lagoon, the Jennite Pit and portions of 22nd Street. Groundwater remediation activities to date have included groundwater sampling and HRC® injections in the PCP contaminant plume.

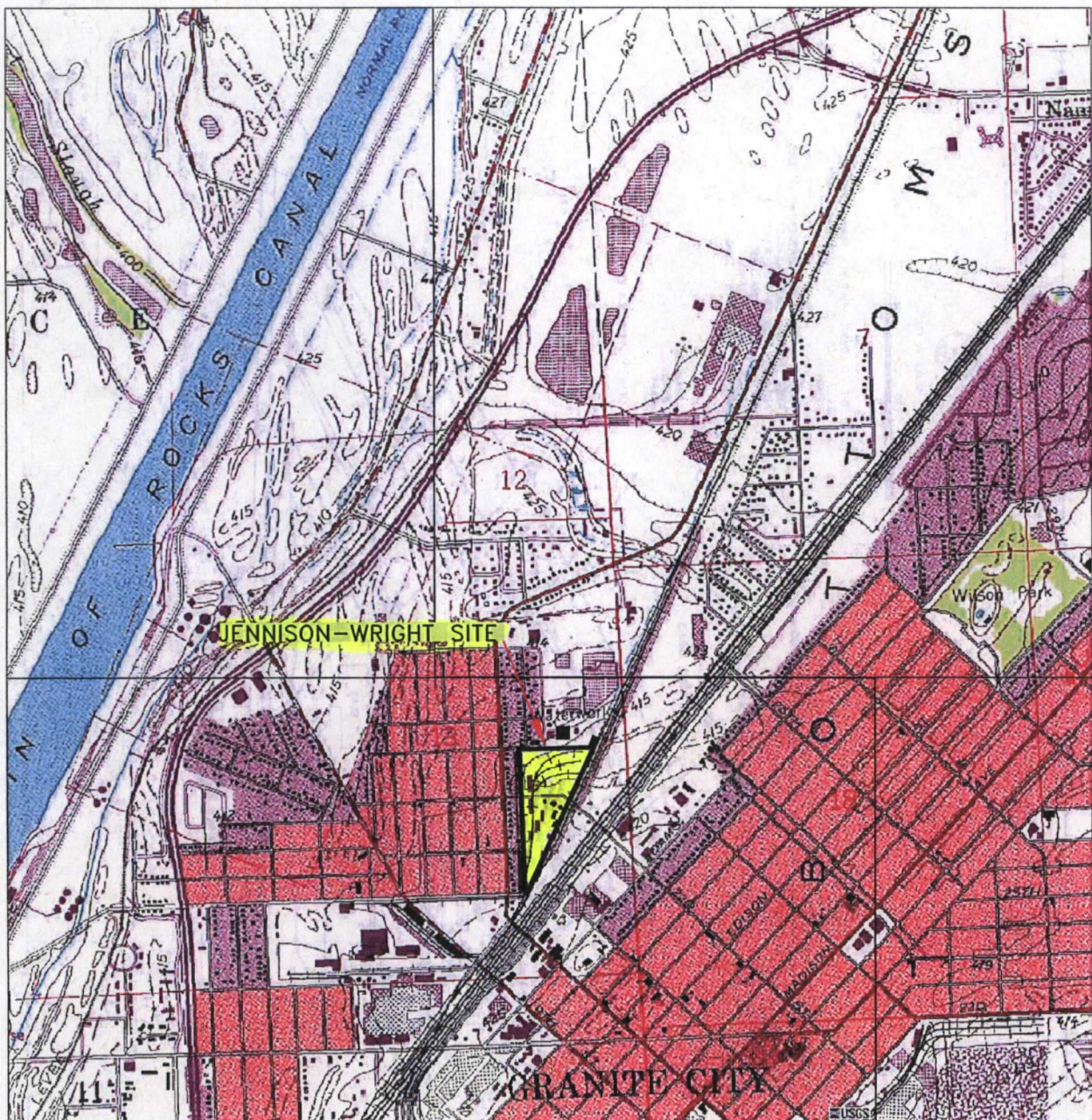
Tasks remaining are:

- Codification of ICs in an environmental covenant under the UECA
- Placement of a CERCLA windfall lien on the property
- Re-grading of the southern portion for water runoff control in a shallower retention pond than the current retention pond and to provide a means for the collection of water runoff in the alley adjacent to the site, which has been a concern for a number of years;
- The replacement of the undersized OWS in the NAPL treatment system; and,
- Continued operation of the hot water injection system.

APPENDIX B – additional maps, data, figures, or tables for reference

Attachment 1

Site Maps and Figures



SCALE 1:24000

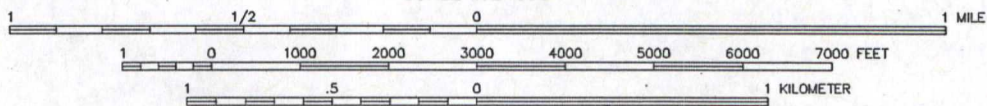


FIGURE 1 - SITE LOCATION MAP
JENNISON-WRIGHT SITE
GRANITE CITY, ILLINOIS

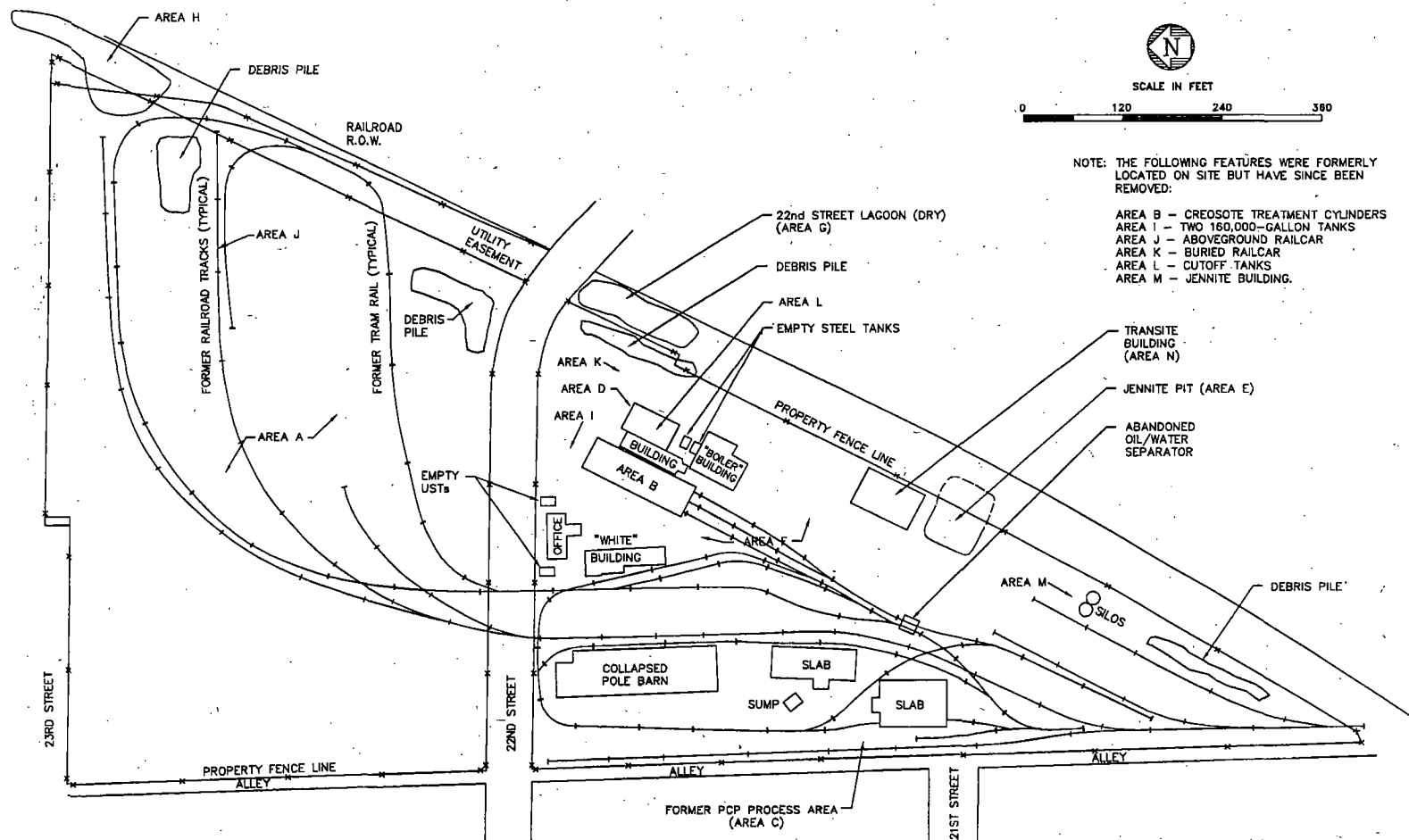


FIGURE 2:
SITE LAYOUT MAP

JENNISON-WRIGHT SITE
GRANITE CITY, MADISON COUNTY,
ILLINOIS

SCALE	DATE ISSUED	S.A.A. FILE NO.	ISSUED BY	REV.
1" = 100'	02/2011	Features.DWG	2	

Attachment 2

Public Notice of Five-Year Review

Attachment 3

Site Inspection Checklist

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

D-7

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency Granite City Village Hall 618-452
Contact Jonathon Ferry Economic Development 5-15-14 6214
Name Director Title Date Phone no.
Problems; suggestions; Report attached Knows of no particular issues with the
site.

Agency Mayor Wagoner 618-452-
Contact Village Granite City Mayor 5-14-14 6214
Name Title Date Phone no.
Problems; suggestions; Report attached Left message

Agency _____				
Contact _____				
Name _____		Title _____	Date _____	Phone no. _____
Problems; suggestions; Report attached _____				

Agency _____					
Contact _____					
Name _____		Title _____	Date _____	Phone no. _____	
Problems; suggestions; Report attached _____					

4. **Other interviews (optional)** Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)			
1.	O&M Documents O&M manual As-built drawings Maintenance logs Remarks _____	<u>Readily available</u> <u>Readily available</u> <u>Readily available</u>	<u>Up to date</u> <u>Up to date</u> <u>Up to date</u> N/A N/A N/A
2.	Site-Specific Health and Safety Plan Contingency plan/emergency response plan Remarks _____	<u>Readily available</u> <u>Readily available</u>	<u>Up to date</u> <u>Up to date</u> N/A N/A
3.	O&M and OSHA Training Records Remarks _____	Readily available	Up to date N/A
4.	Permits and Service Agreements Air discharge permit Effluent discharge Waste disposal, POTW Other permits _____ Remarks _____	Readily available Readily available Readily available Readily available	Up to date Up to date Up to date Up to date N/A N/A N/A N/A
5.	Gas Generation Records Remarks _____	Readily available	Up to date N/A
6.	Settlement Monument Records Remarks _____	Readily available	Up to date N/A
7.	Groundwater Monitoring Records Remarks _____	<u>Readily available</u>	<u>Up to date</u> N/A
8.	Leachate Extraction Records Remarks _____	Readily available	Up to date N/A
9.	Discharge Compliance Records Air Water (effluent) Remarks _____	Readily available Readily available	Up to date Up to date N/A N/A
10.	Daily Access/Security Logs Remarks _____	Readily available	Up to date N/A

IV. O&M COSTS			
1.	O&M Organization State in-house _____ PRP in-house _____ Federal Facility in-house _____ Other _____	<div style="border: 1px solid black; border-radius: 15px; padding: 2px; display: inline-block; margin-bottom: 5px;">Contractor for State</div> Contractor for PRP _____ Contractor for Federal Facility _____	
2.	O&M Cost Records Readily available _____ Up to date _____ Funding mechanism/agreement in place _____ Original O&M cost estimate _____ Breakdown attached _____ Total annual cost by year for review period if available		
	From <u>FY 09</u> To _____	<u>9,313,681</u> Total cost	Breakdown attached
	From <u>FY 10</u> To _____	<u>3,534,067</u> Total cost	Breakdown attached
	From <u>FY 11</u> To _____	<u>2,067,170</u> Total cost	Breakdown attached
	From <u>2012</u> To _____	<u>510,331</u> Total cost	Breakdown attached
	From <u>2013</u> To _____	<u>405,453</u> Total cost	Breakdown attached
3.	Unanticipated or Unusually High O&M Costs During Review Period Describe costs and reasons: <u>Reviewing the costs of O&M when the facility was no longer performing construction activities, the cost has reflected the fine tuning of the system with marked reduction in costs. There are a few months where costs appear to spike but are usually coincide with a sampling event.</u>		
V. ACCESS AND INSTITUTIONAL CONTROLS Applicable N/A			
A. Fencing			
1.	Fencing damaged Location shown on site map _____ Remarks <u>Gate near alley was bent. Follow up visit - fencing repaired.</u>	Gates secured _____	N/A
B. Other Access Restrictions			
1.	Signs and other security measures Location shown on site map _____ Remarks _____		N/A

C. Institutional Controls (ICs)			
1.	Implementation and enforcement		
	Site conditions imply ICs not properly implemented	Yes <input type="radio"/> No <input checked="" type="radio"/>	N/A
	Site conditions imply ICs not being fully enforced	Yes <input type="radio"/> No <input checked="" type="radio"/>	N/A
	Type of monitoring (e.g., self-reporting, drive by) <u>inspection</u>		
	Frequency <u>2 / year</u>		
	Responsible party/agency <u>IEPA</u>		
	Contact <u>Erin Rednow</u>	Title <u>Project manager</u>	Date <u>2/7-785-8725</u>
		Name	Phone no.
	Reporting is up-to-date	<input checked="" type="radio"/> Yes <input type="radio"/> No	N/A
	Reports are verified by the lead agency	<input checked="" type="radio"/> Yes <input type="radio"/> No	N/A
	Specific requirements in deed or decision documents have been met	<input checked="" type="radio"/> Yes <input type="radio"/> No	N/A
	Violations have been reported	<input type="radio"/> Yes <input checked="" type="radio"/> No	N/A
	Other problems or suggestions: Report attached		
2.	Adequacy		
	ICs are adequate	ICs are inadequate	N/A
	Remarks <u>Institutional Controls need to be codified into a Universal Environmental Covenant Act document (UECA)</u>		
D. General			
1.	Vandalism/trespassing	Location shown on site map	No vandalism evident
	Remarks <u>no evidence of interior trespassing but some damage to fence.</u>		
2.	Land use changes on site	N/A	
	Remarks <u>no</u>		
3.	Land use changes off site	N/A	
	Remarks <u>no</u>		
VI. GENERAL SITE CONDITIONS			
A. Roads	Applicable	N/A	
1.	Roads damaged	Location shown on site map	<input checked="" type="radio"/> Roads adequate <input type="radio"/> N/A
	Remarks		

B. Other Site Conditions			
Remarks _____ _____ _____ _____ _____			
VII. LANDFILL COVERS Applicable <u>N/A</u>			
A. Landfill Surface			
1.	Settlement (Low spots) Areal extent _____ Remarks _____	Location shown on site map _____ Depth _____	Settlement not evident
2.	Cracks Lengths _____ Remarks _____	Location shown on site map _____ Widths _____ Depths _____	Cracking not evident
3.	Erosion Areal extent _____ Remarks _____	Location shown on site map _____ Depth _____	Erosion not evident
4.	Holes Areal extent _____ Remarks _____	Location shown on site map _____ Depth _____	Holes not evident
5.	Vegetative Cover Trees/Shrubs (indicate size and locations on a diagram) Remarks _____	Grass _____ Cover properly established	No signs of stress
6.	Alternative Cover (armored rock, concrete, etc.) Remarks _____	N/A	
7.	Bulges Areal extent _____ Remarks _____	Location shown on site map _____ Height _____	Bulges not evident

8.	Wet Areas/Water Damage	Wet areas/water damage not evident	
	Wet areas	Location shown on site map	Areal extent _____
	Ponding	Location shown on site map	Areal extent _____
	Seeps	Location shown on site map	Areal extent _____
	Soft subgrade	Location shown on site map	Areal extent _____
	Remarks _____		
9.	Slope Instability	Slides	Location shown on site map No evidence of slope instability
	Areal extent _____		
	Remarks _____		
B. Benches	Applicable	N/A	
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			
1.	Flows Bypass Bench	Location shown on site map	N/A or okay
	Remarks _____		
2.	Bench Breached	Location shown on site map	N/A or okay
	Remarks _____		
3.	Bench Overtopped	Location shown on site map	N/A or okay
	Remarks _____		
C. Letdown Channels	Applicable	N/A	
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)			
1.	Settlement	Location shown on site map	No evidence of settlement
	Areal extent _____	Depth _____	
	Remarks _____		
2.	Material Degradation	Location shown on site map	No evidence of degradation
	Material type _____	Areal extent _____	
	Remarks _____		
3.	Erosion	Location shown on site map	No evidence of erosion
	Areal extent _____	Depth _____	
	Remarks _____		

4.	Undercutting	Location shown on site map	No evidence of undercutting
	Areal extent _____	Depth _____	
	Remarks _____		
5.	Obstructions	Type _____	No obstructions
	Location shown on site map	Areal extent _____	
	Size _____		
	Remarks _____		
6.	Excessive Vegetative Growth	Type _____	
	No evidence of excessive growth		
	Vegetation in channels does not obstruct flow		
	Location shown on site map	Areal extent _____	
	Remarks _____		
D. Cover Penetrations Applicable <u>N/A</u>			
1.	Gas Vents	Active	Passive
	Properly secured/locked	Functioning	Routinely sampled Good condition
	Evidence of leakage at penetration		Needs Maintenance
	N/A		
	Remarks _____		
2.	Gas Monitoring Probes		
	Properly secured/locked	Functioning	Routinely sampled Good condition
	Evidence of leakage at penetration		Needs Maintenance N/A
	Remarks _____		
3.	Monitoring Wells (within surface area of landfill)		
	Properly secured/locked	Functioning	Routinely sampled Good condition
	Evidence of leakage at penetration		Needs Maintenance N/A
	Remarks _____		
4.	Leachate Extraction Wells		
	Properly secured/locked	Functioning	Routinely sampled Good condition
	Evidence of leakage at penetration		Needs Maintenance N/A
	Remarks _____		
5.	Settlement Monuments	Located	Routinely surveyed N/A
	Remarks _____		

E. Gas Collection and Treatment		Applicable	N/A
1.	Gas Treatment Facilities Flaring Good condition Remarks _____	Thermal destruction Needs Maintenance	Collection for reuse
2.	Gas Collection Wells, Manifolds and Piping Good condition Remarks _____	Needs Maintenance	
3.	Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings) Good condition Remarks _____	Needs Maintenance	N/A
F. Cover Drainage Layer		Applicable	N/A
1.	Outlet Pipes Inspected Remarks _____	Functioning	N/A
2.	Outlet Rock Inspected Remarks _____	Functioning	N/A
G. Detention/Sedimentation Ponds		Applicable	N/A
1.	Siltation Areal extent _____ Depth _____ Siltation not evident Remarks _____		N/A
2.	Erosion Areal extent _____ Depth _____ Erosion not evident Remarks _____		
3.	Outlet Works Remarks _____	Functioning	N/A
4.	Dam Remarks _____	Functioning	N/A

H. Retaining Walls		Applicable	N/A
1.	Deformations Horizontal displacement _____ Rotational displacement _____ Remarks _____	Location shown on site map	Deformation not evident
2.	Degradation Remarks _____	Location shown on site map	Degradation not evident
I. Perimeter Ditches/Off-Site Discharge		Applicable	N/A
1.	Siltation Areal extent _____ Remarks _____	Location shown on site map Depth _____	Siltation not evident
2.	Vegetative Growth Vegetation does not impede flow Areal extent _____ Remarks _____	Location shown on site map Type _____	N/A
3.	Erosion Areal extent _____ Remarks _____	Location shown on site map Depth _____	Erosion not evident
4.	Discharge Structure Remarks _____	Functioning	N/A
VIII. VERTICAL BARRIER WALLS		Applicable	N/A
1.	Settlement Areal extent _____ Remarks _____	Location shown on site map Depth _____	Settlement not evident
2.	Performance Monitoring Type of monitoring _____ Performance not monitored Frequency _____ Head differential _____ Remarks _____		Evidence of breaching

IX. GROUNDWATER/SURFACE WATER REMEDIES		Applicable	N/A
A. Groundwater Extraction Wells, Pumps, and Pipelines		Applicable	N/A
1.	Pumps, Wellhead Plumbing, and Electrical Good condition All required wells properly operating Needs Maintenance N/A Remarks _____ _____ _____		
2.	Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances Good condition Needs Maintenance Remarks _____ _____ _____		
3.	Spare Parts and Equipment Readily available Good condition Requires upgrade Needs to be provided Remarks _____ _____ _____		
B. Surface Water Collection Structures, Pumps, and Pipelines		Applicable	N/A
1.	Collection Structures, Pumps, and Electrical Good condition Needs Maintenance Remarks <u>Default retention pond needs to be regraded to lessen the slope of the sides. Photo attached</u> _____ _____		
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances Good condition Needs Maintenance Remarks <u>NA</u> _____ _____		
3.	Spare Parts and Equipment Readily available Good condition Requires upgrade Needs to be provided Remarks <u>NA</u> _____ _____		

C. Treatment System		Applicable	N/A
1.	Treatment Train (Check components that apply) Metals removal _____ Oil/water separation _____ Bioremediation _____ Air stripping _____ Carbon adsorbers _____ Filters _____ Additive (e.g., chelation agent, flocculent) _____ Others _____ Good condition _____ Needs Maintenance _____ Sampling ports properly marked and functional <u>yes</u> Sampling/maintenance log displayed and up to date <u>yes</u> Equipment properly identified <u>yes</u> Quantity of groundwater treated annually <u>yes</u> Quantity of surface water treated annually <u>NA</u> Remarks _____		
2.	Electrical Enclosures and Panels (properly rated and functional) N/A _____ Good condition _____ Needs Maintenance _____ Remarks _____		
3.	Tanks, Vaults, Storage Vessels N/A _____ Good condition _____ Proper secondary containment _____ Needs Maintenance _____ Remarks _____		
4.	Discharge Structure and Appurtenances N/A _____ Good condition _____ Needs Maintenance _____ Remarks _____		
5.	Treatment Building(s) N/A _____ Good condition (esp. roof and doorways) _____ Needs repair _____ Chemicals and equipment properly stored _____ Remarks _____		
6.	Monitoring Wells (pump and treatment remedy) Properly secured/locked _____ Functioning _____ Routinely sampled _____ Good condition _____ All required wells located _____ Needs Maintenance _____ N/A _____ Remarks _____		
D. Monitoring Data			
1.	Monitoring Data Is routinely submitted on time _____ Is of acceptable quality _____		
2.	Monitoring data suggests: Groundwater plume is effectively contained _____ Contaminant concentrations are declining _____		

D. Monitored Natural Attenuation			
1.	Monitoring Wells (natural attenuation remedy)		
	Properly secured/locked	Functioning	Routinely sampled
	All required wells located	Needs Maintenance	Good condition
	Remarks		N/A
X. OTHER REMEDIES			
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.			
XI. OVERALL OBSERVATIONS			
A. Implementation of the Remedy			
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).			
<p>System began NAPL extraction much earlier than anticipated. And at a much greater amount.</p> <p>the Oil & water separator has not been able to work efficiently and needs to be replaced with a larger unit.</p>			
B. Adequacy of O&M			
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.			

C. Early Indicators of Potential Remedy Problems
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.
<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
D. Opportunities for Optimization
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.
as discussed previously. Larger OWS
<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Attachment 4

Granite City Drinking Water Ordinance #7529

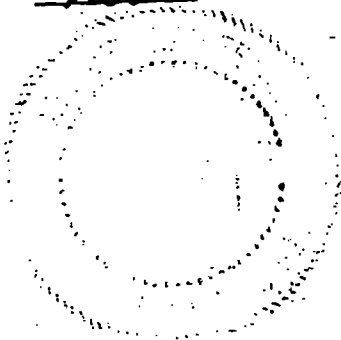
STATE OF ILLINOIS)
COUNTY OF MADISON) SS
CITY OF GRANITE CITY)

CERTIFICATION

I, JUDY J. WHITAKER, City Clerk of the City of Granite
City, Madison County, Illinois, do hereby certify that the foregoing pages
constitute a true Ordinance No. 7529 of said City, passed and approved on this
17th day of July, 2001 and the same was signed and
approved by the Mayor of said City on the 17th of
July, 2001.

I DO FURTHER CERTIFY that said Ordinance has been
spread at length upon the permanent records of said City, where it now
appears and remains in effect.

IN WITNESS WHEREOF, I have hereunto set my hand and
affixed the seal of said City this 18th day of July,
19 2001.



Judy Whitaker
CITY CLERK

(SEAL)

ORDINANCE NO. 7529

**AND ORDINANCE PROHIBITING THE USE OF GROUNDWATER AS A POTABLE
WATER SUPPLY BY THE INSTALLATION OR USE OF POTABLE WATER SUPPLY
WELLS OR BY ANY OTHER METHOD**

WHEREAS, certain properties in the City of Granite City, Illinois, have been used over a period of time for commercial/industrial purposes; and

WHEREAS, because of said use, concentrations of certain chemical constituents in the groundwater beneath the City may exceed Class I groundwater quality standards for potable resource groundwater as set forth in 35 Illinois Administrative Code 620 or Tier 1 residential remediation objectives as set forth in 35 Illinois Administrative Code 742; and

WHEREAS, the city of Granite City desires to limit potential threats to human health from groundwater contamination while facilitating the redevelopment and productive use of properties that are the source of said chemical constituents.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF GRANITE CITY AS FOLLOWS:

Section 1. Use of Groundwater as potable water supply prohibited. Except for such uses or methods in existence before the effective date of this ordinance, the use or attempt to use as a potable water supply groundwater from within the corporate limits of the City of Granite City by the installation or drilling of wells or by any other method is hereby prohibited, including at points of withdrawal by the City of Granite City.

Section 2. Penalties. Any person violating the provisions of this ordinance shall be subject to a fine of up to \$750.00 for each violation, except that the City itself shall not be liable under any circumstances.

Section 3. Definitions. "Person" is any individual, partnership, co-partnership, firm, company, limited liability company, corporation, association, joint stock company, trust, estate, political subdivision, or any other legal entity, or their legal representatives, agents or assigns.

"Potable Water" is any water used for human or domestic consumption, including, but not limited to, water used for drinking, bathing, swimming, washing dishes, or preparing foods.

Section 4. Memorandum of Understanding. As this Ordinance applies to the City of Granite aCity, no Memorandum of Understanding is required.

Section 5. Repealer. All ordinances or parts of ordinances in conflict with this ordinance are hereby repealed insofar as they are in conflict with this ordinance.

Section 6. Severability. If any provision of this ordinance or its application to any person or under any circumstances is adjudged invalid, such adjudication shall not affect the validity of the ordinance as a whole or of any portion not adjudged invalid.

Section 7. Effective Date. This ordinance shall be in full force and effect from an after its passage approval and publication as required by law.

PASSED by the City Council of the City of Granite City, Illinois, this 17th day of _____

July, 2001.

APPROVED by the Mayor of the City of Granite City, Illinois, this 17th day of _____

July, 2001.

Paul D. Dyer

MAYOR

ATTEST:

Judy Whitaker
City Clerk